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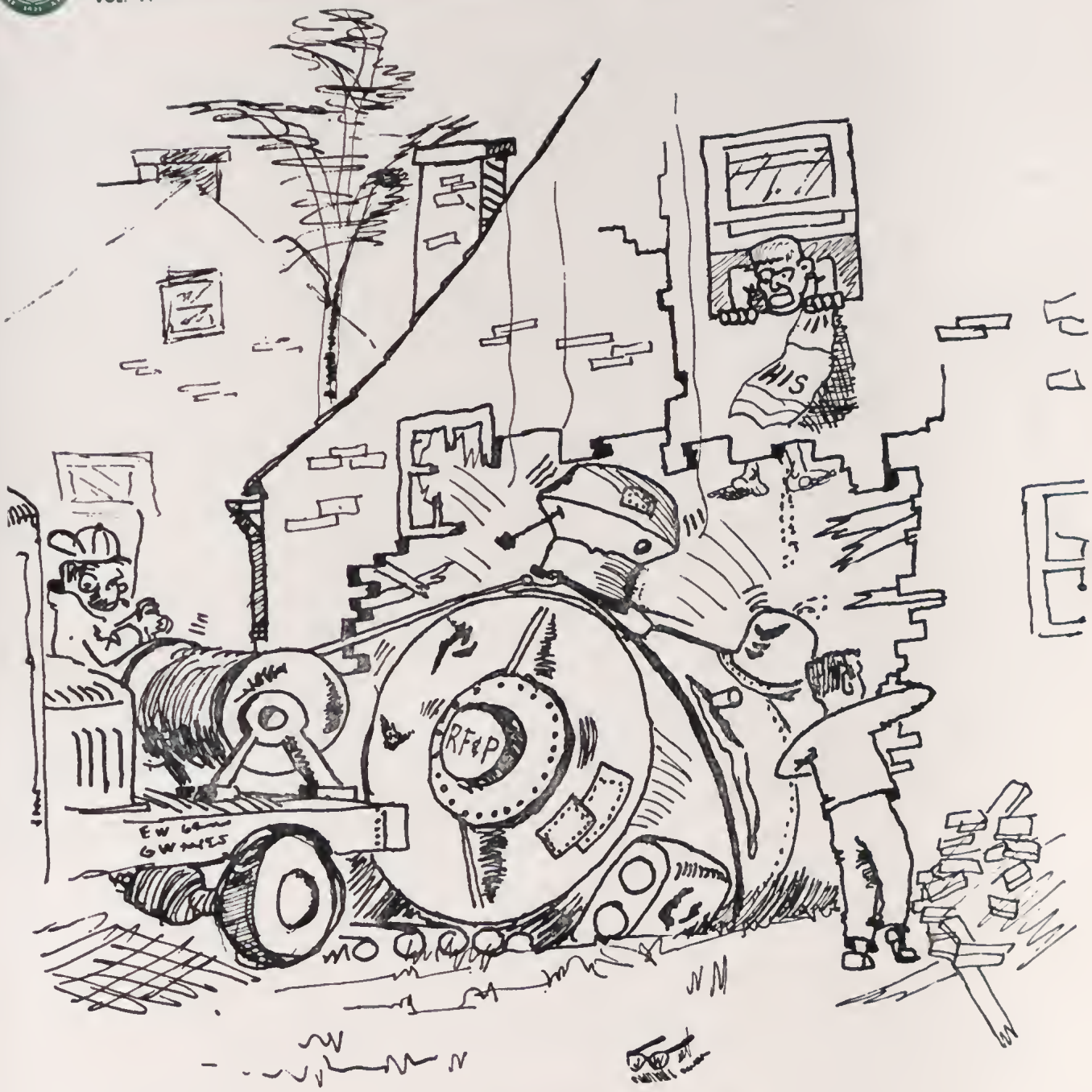

SCHOOL OF ENGINEERING
THE GEORGE WASHINGTON UNIVERSITY

APRIL 1955

John F. Holt, class of '47

speaks from experience when he says . . .

"Expanding research and product development at U. S. Steel mean more opportunities for qualified engineers"

SINCE 1952, John F. Holt has been Assistant Superintendent of the Coke and Coal Chemicals Department at United States Steel's new Fairless Works in Morrisville, Pa. He started working at U.S. Steel—as a trainee—in 1947. That's a lot of progress in just five years. For in his present position, John is responsible for both the quality and the quantity of all coal chemicals produced at the Fairless Works—about 3,500,000 gallons of light oils per year. 190 hourly employees and 25 supervisory personnel report to him.

But John's case of rapid advancement is not unusual. U.S. Steel has always placed great emphasis upon its management training programs and has provided the kind of training that enables ambitious young engineers to take over responsible positions within a comparatively short time.

As one example, John feels that the opportunities in his own department are very promising at this time. He says, "Many important new concepts of modernization and expansion in such fields as the carbonization of coal and synthetic products are coming up every day pointing the way to extensive future developments. Well-trained engineers will be in a position to lead the way into these new areas of industry."

If you are interested in a challenging and rewarding career with United States Steel and feel that you can qualify, you can obtain further information from your college placement director. Or we will gladly send you our informative booklet, "Paths of Opportunity," upon request. Just write to United States Steel Corporation, Personnel Division, Room 1622, 525 William Penn Place, Pittsburgh 30, Pa.

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UNITED STATES STEEL HOMES, INC. • UNION SUPPLY COMPANY • UNITED STATES STEEL EXPORT COMPANY • UNIVERSAL ATLAS CEMENT COMPANY

A MESSAGE TO
COLLEGE ENGINEERING
STUDENTS

from Donald C. Burnham, Vice-President
Manufacturing,
Westinghouse Electric Corporation
Purdue University, 1936

To the young engineer with a creative mind

America is on the threshold of the *automation era*.

New automatic machines with their electronic brains are opening the way to a tremendous industrial development in which machines will largely replace man's routine brainwork and handwork.

Westinghouse is taking a leading part in developing equipment for the automatic factory. At our new Columbus, Ohio plant, refrigerators move along *27 miles* of automatic conveyors, with many parts being installed by automatic assembling machines...refrigerator controls are automatically calibrated... automatic testing devices maintain quality control...and the crated refrigerator is automatically conveyed to warehouse storage.

At Westinghouse, young engineers like you are playing an increasingly important role in such new developments for all kinds of industry. Here, there is plenty of room for your creative talents to expand—in designing new products . . . and in developing new improvements for existing products. It's a fascinating job that offers you real opportunities for growth.

And at Westinghouse, we recognize *individual ambition* as well as technical ability. There will *always be a place* for the young engineer who wants to forge ahead. For professional development you can do graduate work toward Master's and Ph.D. degrees in 19 universities. You will be treated as an individual and Westinghouse will do all in its power to help you reach your goal.

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YOU CAN BE SURE... IF IT'S
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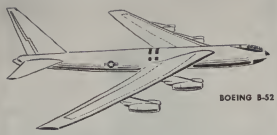
Ask your Placement Officer about career opportunities at Westinghouse, or write for these two booklets: *Continued Education in Westinghouse* (describing our Graduate Study Program) and *Finding Your Place in Industry*.

To get these booklets, write: Mr. T. E. Stieber, Regional Educational Co-ordinator, Westinghouse Electric Corporation, 3001 Walnut St., Philadelphia 4, Pa.



BOEING B-52

NORTH AMERICAN F-100

they all fly on one engine!

CONVAIR F-102

DOUGLAS A3D

DOUGLAS F4D

BOEING 707

These planes are some of America's newest, biggest, best — setting new standards for speed, maneuverability, reliability.

Widely separated airframe engineering groups developed these record makers. Yet each plane has one vital feature in common —

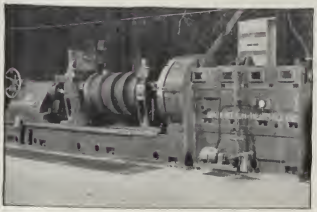
the engines are Pratt & Whitney Aircraft's J-57 turbojets — the most powerful production aircraft engines in the world!

Is it any wonder that so many young engineering graduates want to work for the world's foremost designer of aircraft engines?

PRATT & WHITNEY AIRCRAFT
Division of United Aircraft Corporation
East Hartford 8, Connecticut

Another page for **YOUR BEARING NOTEBOOK**

How to carry 35-ton loads in a roll-neck lathe



The engineers who designed this roll-neck lathe were faced with three problems. 1) To build a lathe that would cut finishing time as much as 75%; 2) To build a lathe that would give great accuracy and 3) To provide great load-carrying capacity as well. Their answer was this electronically-controlled mill roll lathe. To carry the 35-ton loads with a maximum runout of .0003 and still do the job quickly, they specified Timken® tapered roller bearings.

Why TIMKEN® bearings have high load capacity

This cross-section of a Timken tapered roller bearing illustrates one reason why Timken bearings do such a good job under heavy load conditions. Notice that there is full line contact between the rollers and races. It's this full line contact that distributes the load over a wider area, gives Timken bearings their extra load-carrying capacity.

Want to learn more about bearings or job opportunities?

Some of the engineering problems you'll face after graduation will involve bearing applications. For help in learning more about bearings, write for the 270-page General Information Manual on Timken bearings. And for information about the excellent job opportunities at the Timken Company, write for a copy of "This Is Timken". The Timken Roller Bearing Company, Canton 6, O.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃
BEARING TAKES RADIAL ⟠ AND THRUST —⊕— LOADS OR ANY COMBINATION ✳

The Mechelectiv

VOL. 14 APRIL 1955 NO. 5

SCHOOL OF ENGINEERING, THE GEORGE WASHINGTON UNIVERSITY

IN THIS ISSUE

ON OUR COVER

The process of installing a locomotive boiler in the basement of a house is quite difficult, not to mention being destructive. The boiler is a part of the apparatus necessary in creating a resonant frequency bathroom; for complete details on this project turn to page 6.

FRONTISPIECE

The last major construction work done within the campus was the annexation of Building D and the library. The picture shows the rear wall of Building D after the interior had been razed. The construction awaited now is the new Tompkins Hall, for which groundbreaking ceremonies were held just before the Easter vacation.

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Subscription price: Two Dollars

How to Build

A RESONANT FREQUENCY BATHROOM

By Guerdon Trueblood

In keeping with the "build-it-yourself" trend which is sweeping the country, the following article is presented in the hope that those hobbyists among the readers will find in it a new avenue on which to steer their creative efforts.

Unfortunately, this article will only concern those people who like to sing in the bathroom. If you are not one of those select few who do, then I feel sorry for you; not because what I have to say will be of little interest to you, but rather that you have bypassed one of the finer things of life.

Any observant person has noted, as he sings away while bathing, that there is one note louder than the others, one note of brilliance and feeling. When you put your heart into that one frequency of sound, the whole house feels as if it were shaking with the beauty of it, and if your house is anything like the one I live in, it *is* shaking. Your imagination has nothing to do with it.

The reason for this occurrence is the simple law of resonance. As applied to this case, it may be stated that any reinforcement of sound caused by sympathetic vibrations is resonance. Only one frequency of sound, or a multiple of it, will cause the greatest reinforcement. The exact frequency depends on the volume of the room, or cavity, the gain in intensity of the sound depends on the rigidity of the walls. Other notes may seem louder in the bathroom, as compared with elsewhere, because it is a confined space and you are alone. But this is not resonance; it is art.

The first time I realized my bathroom was resonant, I felt weak inside, giddy, for with that realization had come a promise of an ecstatic future. You see, I was tired of solo work. It is adequate to a beginning bathroom artist, but it soon loses its glamour when you think of duets and accompaniment features. I tried the aria from "Faust" across the point of resonance and reeled drunkenly from the tub when I had finished the second ending. I have a high voice, unfortunately, but when I sang the high note of the aria, I heard another voice join mine to support the beauty of the thing: it was the voice of the bathroom. The sound of that one note set the bathroom to vibrating at its resonant point, one octave below my voice. It was breathtaking.

The tragic part of my discovery was learning that only one note could resonate the bathroom. Singing the same note can be pretty monotonous, if you have ever tried it. The only way to change the point of resonance was to change the volume of the bathroom cavity. I first tried placing large, airtight wooden boxes in the middle of the floor, and succeeded in raising the resonant point from D-flat to E-natural, a distance of three musical half-steps. I divided the total computed volume of all the boxes by three to determine the size of a box equivalent to one half-step, and then built three new boxes of just that volume each. I then had four different notes of resonance if I removed or added the new boxes to the bathroom cavity.

This system worked quite well until my wife put a stop to it. She said that she was sick and tired of hearing me stop in the middle of a song, splash out of the tub, open the bathroom door, throw one of the boxes into the hall, slam the door, jump into the tub and begin again on a different note. The wallpaper in the hall began to peel from the effects of the steam escaping through the door when I opened it. The door even suffered a mishap at the end of the second act of "The Pirates of Penzance." I was training myself to add or subtract a box from the room without losing a beat, and didn't quite get the door open when I threw one out. The bathroom got a new door and the boxes got the fireplace.

For weeks I wondered how to recapture the paradise I had known before, and yet have a greater range of resonance. Being an artist and not an athlete, I hoped to make the process automatic, or at least semi-automatic. One evening, I was sitting in the bathtub rendering my version of "The Desert Song," when my eyes strayed to the ceiling. The key was there; all I had to do was make the ceiling move up and down at my command. It would change the volume of the bathroom and thus its resonant frequency, too. I would have the ultimate in artistic goals—the variable resonant frequency bathroom would be mine!

I computed the distance the ceiling would have to travel to change the frequency one half-step in pitch, picked an arbitrary point to be ceiling center pitch, and drew up the plans. The average hobbyist will have to consult a trained sound engineer for figures to suit his individual bathroom.

(A word of caution. Be discriminating in your choice of the man. Some people just wouldn't understand . . .)

The next step is procuring a 1908 OTIS two-story, steam operated, hydraulic elevator lift mechanism. I found it to be the most acceptable of all the commercial equipments available today. Recondition the machinery and then try a test run in your garage, using the family automobile for a suitable weight. Be careful to balance the car perfectly on the lift platform and refrain from raising it too high, or you may have to buy a new garage. I was fortunate in thinking to use my neighbor's garage and it became his problem when my Stutz went through the roof. You must forgive me, but most pioneers have been known to make mistakes. When it operates satisfactorily, go on to the next step.

The machinery must have a suitable platform to rest upon and in most cases the structure of the house has to be of steel reinforced. The machinery only weighs 4750 pounds, so your stress computations do not have to be too exacting. After the platform is constructed, an aperture must be opened in the roof to allow the crane to set the machinery in place. Bolt it down securely, with the lift platform just level with the ceiling at center pitch.

The boiler must then be installed in the basement. Any one will do, really. I used an 1867 Baldwin freight locomotive boiler which has rendered comparatively trouble-free operation since the time it indulged in a minor explosion which shattered all the windows in the house and flooded the basement. The simplest way to place it in the basement is to dig a sloping roadway in the lawn, down to the level of the basement floor. After removing a few bricks from the outside wall, the boiler slips into place easily. You may find it necessary to deepen your basement somewhat and strengthen the floor, but, again, this would be an individual problem for each house involved. The steam pipes to the lift mechanism should be run inside the house, as the loss in pressure from condensation during the winter months could raise havoc with the simplest chorale.

Next, you have to make a few simple alterations in the bathroom structure. Knock out the ceiling and insert a stainless steel sleeve flush with the walls and corners. Allow the bottom of the sleeve to sit three feet below ceiling center pitch and the top continue to at least three feet above center. Then construct a piston ceiling of one-half inch sheet steel to fit perfectly into the sleeve. When first inserted, mine squeaked as it slid up and down, but a few applications of Wildroot Cream Oil quieted it down considerably.

Then attach the steel ceiling to the lift mechanism by means of copper push rods. A few lever problems might arise, but a working knowledge of integral calculus should be more than adequate for their solution.

The majority of the work is now done. The bathtub control is the only remaining addition. An elevator handle is installed slightly above the soap dish in the spot where you always reach for the soap when your eyes are closed. This will enable you to always find the handle, and results in a considerable yearly saving on soap. The handle is connected to the lift mechanism and your variable resonant frequency bathroom is complete.

It might be suitable here to add a few safety features. A steam release valve on the boiler is a must. I learned this the hard way. A device to stop the ceiling after it comes down so far is a good idea, too. My sister's husband plays professional basketball, and one time when they were visiting, he mistook the ceiling control for the shower valve. He only received a minor concussion, but it could have ruined his career.

Some time will pass before you can judge just where to stop the ceiling to get the proper note, but it is worth all the practice you can afford. In the beginning, it may help to determine exactly where the tones are and mark the ceiling sleeve at those points. However, it is much better to learn to play the bathroom by ear; it is more natural. I can't possibly express how much enrichment my life has received, just from the outlay of a few dollars and the utilization of a few constructive weekends.

First, a careful test run of the machinery should be made in your garage.

CAREER CONFERENCE NOTES

The excerpts published below were taken from notes of the Engineering School Forum at the Annual Career Conference and point up major topics of each speaker. MECHELECIV *thanks Stan Vest for his work in taking the notes.*—ED.

The Engineering Career Forum met in the Hall of Government, Room 101 at 8:30 p.m., March 9, 1955. Mr. Henry B. Paris, Engineers' Council Representative, who did a commendable job of organizing the forum, opened the forum and introduced the speakers for the evening.

The first speaker, Dr. Walter Ramberg, Chief of the Mechanics Division of the Bureau of Standards, discussed "Career Opportunities in Engineering Research."

In Government the needs for the research engineer are in two classes: (1) specialists who devote their full life to one specialized phase of engineering; and (2) people who coordinate research programs, manage them, and keep them moving.

I should like to point out two main deficiencies in engineering graduates: (1) Lack of advanced training; if there is any way you can continue into graduate study, I would strongly urge you to do so. (2) We are poor in communicating with one another. If there is any chance that you can improve your facility for communication, as public speaking and report writing, I feel that would be very useful.

The second speaker, Mr. William R. Ahrendt, President of the Ahrendt Instrument Company, discussed "Career Opportunities in Engineering Development."

Engineering development is the improving of a crude device into something that will work better—to perfect it. Qualifications of a development engineer are: (1) he has to be an engineer; (2) he should be interested in working with his hands, and interested in manufacturing and in economics; (3) he might be somewhat more inclined to work with people than a research engineer would be. A development engineer may be employed by either a large or a small company; in the small company he is likely to work on a whole job, in the large company he may get only a small piece of that job for development.

For private industry, the average starting salary is about $375 dollars with an increase to about $600 after three years. In Government the starting salary is about $300 with an increase to about $500 after three years. The ultimate opportunities in development engineering are up to you; you should realize that learning doesn't stop with graduation and you should learn to work hard in the face of great discouragement.

The third speaker, Mr. Rawlings S. Poole, Chief of the Management Division of the Maintenance Directorate of the Defense Department, discussed "Career Opportunities in Engineering Production."

To be an engineer you almost *must* start with a college education and must be prepared to cope with mathematics, science, and hard work. Industrial leaders and professional experts agree that the situation in regard to the supply of engineers will become more critical than it is now.

To assure success an engineer should have a good command of English, both written and oral; he should fully understand the principles of drawing; he should be informed in general economics, politics, and sociology; he should be familiar with the problems of management; and he should have a fair background of finance economics.

The fourth speaker, Mr. Stuart Bailey of Jansky and Bailey Consulting Engineering Corporation, discussed "Career Opportunities in Consulting Engineering."

A consulting engineer is a professional engineer with a specialized talent and knowledge in a certain field. He applies these specialized talents to the solution of other peoples' problems. All fields have expanded so rapidly that no one man can be an expert in the entire field. The result is the consulting engineering firm which brings together the talent of many different people. The firm usually limits itself to one branch of a field of engineering.

In the relationship of the consulting engineer to a customer there is almost a lawyer to client relationship. The client must have absolute confidence that you will not disclose his secrets to his competitors.

A lively question-answer period followed the prepared speeches, and probably would have continued on into the wee hours of the morning if Henry Paris hadn't called for the end of the questioning at the end of the time allotted to the forum. Although space doesn't permit inclusion of all of the questions and answers, some of the more thought-provoking are given below.

Q. Mr. Poole, which do you think would be the best degree to work for, one in a special field or one in management engineering?

A. I think it depends upon the field in which you plan to work. If you are going into Government, I think it might be well to take graduate work in a particular field of engineering. If you are going to teach, I think it would be advisable to take your graduate work in a specialized field of engineering. If you are inclined to like people, want to work with things that are even more intangible than you find in research work, and have aspirations toward managerial positions in engineering, by all means try to get more education in the management end of engineering.

Q. Mr. Ahrendt, I wonder what the attitude is toward engineers who are graduating in their early thirties?

A. It is entirely possible that their starting salary would be the same as a younger person's but within a few years they might expect to be further ahead of other people who are not as mature. Also, experience might

(Please turn to page 16)

JUST ONE MINUTE

Irvin Schick's occupation alone sets him aside from the majority fo engineering students; he is an instructor at Montgomery Junior College. He is a junior in Electrical Engineering, a field in which his proficiency has shown itself by his membership in Sigma Tau.

By Irvin Schick

A minute of time may seem to be an insignificant interval, or. on the contrary, it may seem to be an eternity. The apparent length of such a moment is, of course, dependent upon the mental condition, as well as the physical condition, of the observer at that instant. Since time is merely a relative term and is not absolute nor independent, it is evident that the human mind might not be consistent in its interpretation of a given period of time.

But science, in order to carry out a program of progress for the benefit of mankind, demands greater accuracy of time measurement than a human being is capable of providing; hence one of the scientists' most important tools is a precision "yardstick" of time. In conducting his laboratory experiments the physicist must control with exactness the time allowed for the reaction under observation. For example, in determining the number of B.T.U. that are given off by the burning of wood alcohol, it is necessary to precisely record the time allowed for the test. The photographer depends upon the accurate measurement of time intervals for consistently obtaining good pictures. Train and bus schedules are prepared on a time basis. Without a common standard of time, important political meetings could not be arranged, business transactions could not be negotiated, and even the lowly three-minute egg could not be accurately cooked. Precision timing is used extensively in connection with those navigation wonders, loran and radar, where it is necessary to measure time accurately down to the fraction of a micro-second because their signals travel about 50 feet in one ten-millionth of a second. Accurate timing is necessary in astronomical computations and in a host of other physical science problems.

The world has always been searching for the best method of obtaining accurate time measurement. Soon after his creation man learned to reckon time in terms of night and day. He also learned to measure the passing of the day by the position of the sun. Later he learned to mark the passing of the night hours by the burning of a notched candle. Through the course of the development of civilization, other types of time-measuring devices appeared such as hour-glasses and crude mechanical clocks. Up to even recent times the most accurate time-measuring device has been the pendulum clock. Recent scientific developments, however, require greater accuracy than such mechanical equipment can provide.

The more recent clocks are those utilizing electric or electronic resonance phenomena for their control. Regardless of the method of control or stabilization of the clock, man has found that the practical, usable standard of time is the earth's rotation. The basic unit of earth's rotation is the day. The day is divided by a suitable time-keeper into twenty-four equal units called hours. These are further subdivided into sixty minutes. The minute is subdivided into sixty seconds. In other words, the problem of a standard clock is to divide accurately the day into 86,400 precisely equal units of time.

A common electronic clock used by the National Bureau of Standards, Bell Telephone Laboratories, and some power companies is a quartz crystal clock. The heart of such a clock is a piezo-electric crystal which electrically vibrates at a frequency determined by its geometry. By carefully controlling the temperature and pressure of such crystals, the frequency of its oscillations can be controlled within very narrow limits. By means of electronic circuits the small time intervals between succeeding cycles of oscillation of the crystal may be formed into larger, more usable intervals of time. However, the quartz-crystal method, like the pendulum method, is subject to inherent physical variances.

For years scientists have felt that possibly the best standard of time lay hidden within the atom. The frequency of the natural atomic vibrations which are closely associated with spectrum lines, are unerringly constant. The atomic motions are on an order of complexity of that of planetary motions. Their periods are on the order of 10^{-15} second and. therefore, are too small for direct comparison. However, in recent years scientists have found a scheme to harness these constant atomic vibrations as a control for time-measuring equipment.

Basically, an atomic clock. as it might well be called, takes the output of an ordinary crystal oscillator,

(Please turn to page 18)

TOMPKINS HALL

Groundbreaking Ceremony

Groundbreakers are, left to right, Dean Mason, President Marvin, Trustee and Donor Tompkins, and Trustee Chairman Fleming.

Work is now in progress on the excavation for the new engineering building, Tompkins Hall. The excavation began immediately after the formal ground breaking ceremony on Thursday, April 7 at 9:30 a.m.

One hundred and seventy-five persons were present at the ceremony on the faculty parking lot between 22nd, 23rd, G and H streets. Present were President Marvin; Trustees Robert Fleming, Newell Ellison, Lyman Briggs, Watson Davis, Mrs. Joshua Evans, Charles Glover, Ulysses Grant 3rd, John McKee, Benjamin McKelway, Charles Tompkins and Alexander Wetmore; Dean Martin Mason; and architect Faulkner. The ceremony began at 9:30 with the dedication prayer by Dr. Sizoo, professor of religion. Doctor Marvin then contrasted the building to be with the small M.E. Lab which served as the engineering school when he first came to the university. Then he introduced trustee and building donor, Charles H. Tompkins. Dr. Tompkins expressed his pleasure in being able to make such a contribution to future students.

Dr. Marvin then introduced Dean Mason as the one "who has been waiting very impatiently for construction to begin." The Dean thanked Dr. Tompkins on behalf of the students and faculty of the School of Engineering. He expressed the opinion that although Mr. Tompkins had turned much ground in his lifetime, this would be the most fruitful ground that he had ever turned.

Then, armed with shovels, President Marvin, Dean Mason, Trustee and Donor Tompkins, and Trustee Chairman Fleming turned the first earth for the construction of Tompkins Hall.

NEW BUILDING DONATED

—A Reprint From The October 1930 MECHELECIV

What was the first reaction to the new building now materializing? This story gives the results of the first announcement of Tompkins Hall.

It has long been the fond hope of the faculty and students of the Engineering School that some day, somehow, the school would be set up in a new building devoted to engineering only. The additional room for classes, lecture rooms and laboratories is keenly felt in Corcoran Hall, where the Physics and Chemistry people themselves are pressed for room. In such a situation any prospect of relief, however remote, is refreshing. It was in this atmosphere that President Marvin gave us the first inkling of the big surprise which was in store for us, as he addressed the Engineers' Banquet last June. He spoke of the need for a bigger engineering school with a building of its own, but made no reference to any concrete resources except the $90,000 promised by Mr. Chas. H. Tompkins which was to be added to from sources later before the building could be begun.

The big news was finally released at the Convocation in June, when President Marvin, again addressing a part of the student body on the occasion of their commencement, made it known that the same Mr. Tompkins had agreed to contribute a total of half a million dollars! This amount is enough to finance the entire building, as now visualized. The outburst which greeted this announcement was, to say the least, unrivaled in the history of G.W.U. convocations.

TOMKINS HALL

A Record of Trials and Tribulations

For over four years, Tompkins Hall has been the most discussed subject in engineering school bull-sessions, both faculty and student. The first formal mention of the building appeared in the October 1950 issue of MECHELECIV, which announced the donation of the building with these words: "It is hoped that the new building will be ready for occupation in two years." The passage of over a year saw little, if any news on Tompkins.

Early in 1952 the owners sketches were first submitted to Faulkner, Kingsbury and Stenhouse, the architects. The May issue of MECHELECIV featured an artist's conception of the building on its cover and dedicated a frontispiece with the factual statement that "the entire block bordered by 22nd, G, 23rd and H streets has been dedicated to the Engineering School."

Again there was a virtual black-out on news on Tompkins; it was with reservation that the May 1953 issue predicted, "In the not too distant future the memories and recollections will be of Tompkins."

The summer of 1953 saw no progress, but in October, News and Views was able to report, "... Building X, which formerly housed the drawing labs will be razed sometime htis fall. Draper Hall, a former veterans' dorm will be renovated to hold the new drawing labs. The remainder of the building will be used for construction offices for the new Tompkins Hall."

It was with great glee that the engineering students greeted the razing of Building X in November and the report of the site clearing in the November issue. No students felt sorrow over the passage of building X; its shaky floors and drafty rooms were the bane of every fledgling engineer in drawing courses. Almost simultaneously with the destruction of building X, early working drawings on Tompkins were received by University officials.

For six months there was again no information released on the impending construction. The May 1954 issue reported that "In the very near future the long awaited announcement of the breaking of ground for the new enginering building, Tompkins Hall, will be made." In June, the specifications and working drawings for the building were made available for sub-contracting bids.

In the summer of 1954, the University encountered difficulties with the District of Columbia Building Commission. The Commission set a precedent with the enforcement of a law that requires a permanent dedication of land for parking when any university building is built. The land set aside for parking must be large enough to accommodate one space for every twenty-five students using the building. Almost as if this were not enough, the parking sites then had to be re-zoned; a cause for further delay.

The site is now cleared, the ground is now broken, and all hope that delays are a thing of the past. Barring further trouble, classes will be held in Tompkins Hall by next February.

The faculty parking lot between H and G, 22nd and 23rd Streets, the site of Tompkins Hall. The dotted lines show the probable outline of the excavation.

OUT OF THE BRIEF CASE

ON CAMPUS

Theta Tau initiated the following men on March 12 at a ceremony at Lisner Auditorium: J. A. Cannon, J. Cauffman, R. Grady, F. A. Mikaliauskas, R. Pronk, J. Saunders, I. Schick, E. Reber, R. Weir, V. Yurow. In the evening, the semi-anuual banquet and ball was held at the Hamilton Hotel.

* * *

Xi chapter of Sigma Tau pledged twelve men on March 16 at their regular meeting. They will be intiated on April 23 and will attend the Sigma Tau banquet and ball that night. Elections held on March 16 for officers to take office April 23 provided these men to hold Sigma Tau's offices for the next year: President — Tom Cresswell, Vice President — Sam Mawhood. Treasurer — Irvin Schick, Historian — Harlan Oelke. Corresponding Secretary — Eric Enholm. and Recording Secretary — George Rogers.

* * *

On March 2, the ASCE heard Dr. Carter, Structural Design Engineer for the Glenn Martin Co., speak on opportunities for civil engineers in the aircraft industry. Dr. Carter pointed out that over 50% of aircraft structural engineers are civil engineers and that 30% of all engineers are in the aircraft industry.

* * *

The March meeting of the AIEE-IRE included the annual IRE Quiz. The quiz had formerly been given orally and by paper to seniors only; this year it was in the form of a written quiz given to all members, with only the seniors eligible for the prize which is based on professional activities and interests as well as the quiz grade. The winner will be announced at this year's Engineer's Banquet and Ball.

* * *

The ASME held a student paper contest at its March meeting. The contest was in the form of speaking on a paper and was won by Ahmed Shah with his talk on "Earth Movers."

IN INDUSTRY

In response to its questionnaire on alumni gifts to universities as a part of its corporate-alumnus program, the General Electric Company found that 45.4 per cent of its college graduate employees had made 15,776 contributions to colleges during the years 1952 and 1954.

* * *

The American Society of Mechanical Engineers will celebrate their 75th anniversary on April 16 at the campus of Stevens Institute of Technology, Hoboken, N. J. The affair will commemorate a meeting in 1880 at which 85 engineers gathered there to adopt the by-laws of the ASME.

* * *

North American Aviation has announced that the first nuclear reactor for private industrial research will be built in the near future. The new reactor is scheduled to be used by Armour Foundation's facilities on the Illinois Institute of Technology campus.

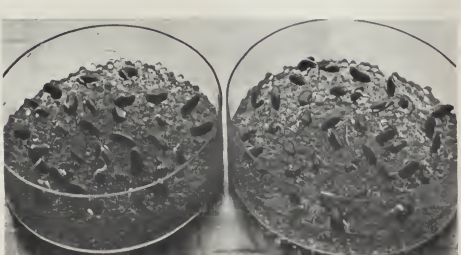
HELICOPTER TURBINE

A "baby gas turbine," designated the XT-58, is being designed by General Electric's Small Aircraft Engine Department for the Navy's Bureau of Aeronautics.

The engine will be comparable in size to the conventional piston power plant in the family automobile, but will be six to eight times more powerful. Primarily, it will be used to power helicopters though, with some modification, it can be adapted to use as a power plant for fixed-wing aircraft either as a turbo-prop or turbo-jet. Another possible application is as a booster for planes powered by reciprocating engines.

As a helicopter power plant, the gas turbine engine will give a smooth vibrationless ride. The lownoise-level of the engine should reduce flying fatigue on both passengers and crew.

In addition to comfort, G-E Engineers predict this small engine will offer many economies for helicopter operation. Not only is the engine smaller, lighter in weight, and easier to install, but studies indicate that it will use less oil and will be easier to cool than other engines of comparable horsepower. It will burn the inexpensive fuel associated with such gas generators.



Kidney beans sprout in a bed of beads in laboratories at the Hanford Atomic Products Operation, Richland, Wash., operated by the General Electric Company for the Atomic Energy Commission. Dirtless beds are used to control the food elements used by the beans. Radioactive isotopes are added to nutrients to study the effects on plants.

The Engineers' Council Elections

On April 22nd and 23rd, G.W.U. engineering students will elect two members from each class, except freshman, to represent them on the Engineers' Council. The incoming freshmen will elect their representatives in the fall of 1956.

This election heralds a trend to a completely democratic method of student government representation. In the past, engineers' council representation was reserved to fraternity and society members with each organization selecting two representatives. Under the present organization, outlined in detail in the October 1954 issue of MECHELECIV, fraternity and society representation has been cut in half to provide for class representation.

Judging from the number of petitions filed for the class representatives positions, this new approach to student government has stirred up a healthy civic interest.

Five candidates, Sam Mawhood, Mike Brady, Matthew Foster, Bill Stamper, and Tom Cresswell have filed for the position of Senior Class Representative.

Sam Mawhood is currently treasurer of the Engineers' Council as well as business manager of the MECHELECIV. In addition, he is a member of both engineering fraternities, Theta Tau and Sigma Tau; he is also a member of Pi Delta Epsilon, journalism honorary.

Mike Brady is also well known around the G.W.U. campus. He is currently Alumni Editor for the MECHELECIV, member of the Engineers' Council, and Secretary of AIEE-IRE. He is also a member of Theta Tau and is serving his pledge period in Sigma Tau, engineering honorary.

Matt Foster has been quite active around the School of Engineering. He has served on the MECHELECIV and is past Treasurer of Theta Tau.

Thomas Creswell is working for his B.S.E. degree and is a member of Sigma Tau. He was just recently elected president of the honorary for the coming school year. Bill Stamper, presently the circulation manager of MECHELECIV, is working for a B.C.E. degree. He is a member of Theta Tau and the A.S.C.E.

Francis Mikalauskas, Earl Reber, Joseph Greblunas, Richard Rumke, and Anthony Lane have petitioned for the Junior representative positions. Francis Mikalauskas and Earl Reber are both members of AIEE-IRE and Theta Tau. Joseph Greblunas is an EE major and is a member of AIEE-IRE, as is Anthony Lane. Richard Rumke is a C.E. and a member of A.S.C.E.

Six students have petitioned for the positions of Sophomore delegate. The first, Robert Shuken, served on the council this year as Freshman delegate representing the day-time students. He is also a member of Alpha Epsilon Pi, a social fraternity. The second petitioner is Howard R. Davis who is majoring in Mechanical Engineering. The third petitioner is Paul Goozh, a Mechanical Engineering and also a member of Alpha Epsilon Pi. Rex Murray is another petitioner with his major in Civil Engineering. Richard Houghton and Fred Shelton are members of the A.S.M.E. and A.I.E.E. respectively.

What Would You Do ?

You, as an engineer, have the job of transporting this 217-ton, 150,000-kilowatt generator stator from Schenectady, N.Y. to Morro Bay, California. Your problems include safe rail and road loads, for the railhead is nine miles from the power station, rail clearances in tunnels and underpasses and transference of the load from rail to road and from road to installation.

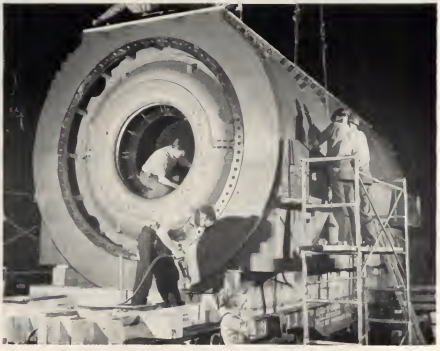
This is an actual problem which recently confronted General Electric and Pacific Gas and Electric engineering staffs. For their solution turn to page 17.

— DATA —

Weight ---------- 217 tons
Origin of Shipment --
-- Schenectady, N. Y.
Destination ---- Morro Bay, Calif.

— PROBLEMS —

Railroad clearances of ½ inch
Two-lane road must be used



The 217 ton generator stator being fitted for the rail leg of its journey.

WHAT A DIFFERENCE
a Few Years Make at ***MARTIN!***

IN 1941, EDWARD E. CLARK WAS A JUNIOR AERODYNAMICIST. SINCE 1951, HE HAS BEEN MANAGER OF THE AERODYNAMICS DEPARTMENT. Opportunity awaits YOU during the next decade at Martin.

IN 1940, HERMAN PUSIN WAS A STRESS ANALYST. SINCE 1950, HE HAS BEEN MANAGER OF THE STRUCTURES DEPARTMENT. Opportunity awaits YOU during the next decade at Martin.

ENGINEER YOUR OWN CAREER

. . . at Martin, where progress toward responsibility is considered as important as development of specialized skills. You'll be assigned challenging work from the beginning—and encouraged to build your own career in an accelerated dual program for technical and administrative growth. At Martin, each engineer is an individual with a recognized personal goal.

IN 1943, JAMES H. BENNETT, JR. WAS A JUNIOR ENGINEER. SINCE 1953, HE HAS BEEN MANAGER OF THE ELECTRO-MECHANICAL DEPARTMENT. Opportunity awaits YOU during the next decade at Martin.

IN 1942, WELCOME W. BENDER WAS A VIBRATION ANALYST. SINCE 1952, HE HAS BEEN MANAGER OF THE ELECTRONICS DEPARTMENT. Opportunity awaits YOU during the next decade at Martin.

Current position vacancies in Engineering at The Glenn L. Martin Co. include the listings below. This year's candidates for AE, ME, EE and CE degrees are especially invited to apply.

Aerodynamics	Propulsion
Airframes and Structures	Electronics
Control Systems	Mechanical Design
Armament	Thermodynamics
Nuclear	Instrumentation
Hydrodynamics	Dynamics
Servo Mechanisms	Electrical

WRITE AT ONCE

to

JOHN M. HOLLYDAY

P.O. BOX 988

MARTIN

BALTIMORE · MARYLAND

(Continued from page 8)

be evaluated and result in a higher starting salary. Maturity in appearance is a great asset when going into a supervisory job.

Q. Do you feel that speech training is desirable?

A. (Dr. Ramberg) Yes, we try to get it to our people by staff meetings of small groups.

A. (Mr. Ahrendt) Absolutely.

A. (Mr. Poole) Very definitely.

A. (Mr. Bailey) I would certainly speak in favor of it.

Q. Do you think that one year of English composition and one semester of report writing are sufficient?

A. (Mr. Bailey) I really don't know. It depends on the course. I think it would be if it is properly geared.

A. (Mr. Ahrendt) If student writing and graduate engineering writing is any indication, I would say definitely "no."

Q. Mr. Ahrendt, do you think the ability of a student to write can be developed or is that a talent he is born with?

A. I would hope that it could be developed and I think it can. I think it is something that can be picked up after you get through school, and it is something you had better pick up if you haven't gotten it in school.

An excellent way of developing writing ability would be to work on your school's magazine. Applicants will be welcomed at the MECHELECIV *office in the Davis-Hodgkins House.*—ED.

Q. Mr. Ahrendt, is the engineer expected to write a finished report without errors in spelling or punctuation, or is it sufficient for the secretary to polish it up?

A. I would prefer a report that is properly punctuated and properly spelled. I believe that it is an indication of the intelligence of a man.

The forum was adjourned at 10:30 p.m. after which the speakers and many of the students continued the discussions on an informal basis over free coffee and doughnuts at the Union.

Answer To "What Would You Do"

(PROBLEM ON PAGE 13)

The generator stator was designed for maximum facility in handling and transporting; its cooling towers were removable units so that clearances in railroad tunnels and underpasses could be met. Hydraulic jacks, winches and skids were used to transfer the load from the special eight-axle freight car to the 82-wheel trailer used to transport the load from the rail head at San Luis Obispo army base at Goldtree, Calif. to Morro Bay.

In order that the road load of the trailer rig and generator, which weighed 275 tons, would be within safe limits, a bed of planks was laid over the road surface. A total of 550 new planks each 20 feet long, 12 inches wide and 3 inches thick were used — enough board feet of lumber to build a six-room house.

A crew of 59 men worked 24 hours a day for eight days with a crane and truck to pick up and lay down the planks 86 times to cover the nine mile stretch.

Although the planks were reduced to kindling by repeated pressure from the trailer wheels, there was no damage to either the road or the stator. The unit will go into service this spring and is to be followed by a second unit in the summer of 1956.

A wooden carpet of planks is laid down to distribute weight of the loaded trailer.

Carpet rolls out as men and machines work to lay down and take up the planks after load has passed.

An Arab furtively stepped on a scale
Near the end of a lingering day
A counterfeit coin he dropped in the slot
And silently stole a weigh

* * *

A college student arrived at the Pearly Gates where St. Peter asked him who he was. When told he was a dentist, St. Peter said, "Go to the devil." Presently, a lawyer arrived and told St. Peter who he was. He was told to go to hell. A weary soul then arrived at the Pearly Gates carrying a slide rule. "I'm an engineer," he replied after questioning. Whereupon St. Peter said, "Come in, son, you've been through hell already."

Tears - And Beers - And A Few Cheers

A bunch of the boys were tossing
them down
At the tavern last night.
They all agreed that life was hard;
Each one had his own sad plight.
They decided that each would air his
woes
To see who would buy the beer;
A liberal arts man was first on his
feet—
He began so that all could hear.

"Life once was so sweet when my
classes were split,
But now they're all in a bunch.
Why, I go from eleven till one P.M.
With not even time for lunch.
My report's no better than two-point-
nine
No matter how hard I have tried."
So they bought him a beer in
sympathy,
And the engineer sat there and cried.

A commerce man was the next to rise;
What a sorrowful tale he did spin.
"I can't accomplish a thing in school,
At pinochle I never win;
A part time job interferes with my
sleep."
And they knew he had not lied,
So they bought him a beer in
sympathy,

And the engineer sat there and cried.
"My case is even sadder yet,"
Said an education man,
"I must turn in a book review
And comic books are banned.
This college life is too rough for me,
I can't wait to get outside."
So they bought him a beer in
sympathy,
And the engineer sat there and cried.

Looking around to the engineer
They gave him a chance to unbend.
"You've heard the woes of the college
Joes,
Let's hear from you now, my friend."
Slowly, deliberately, he got to his feet,
And leaning on his old slide rule,
He began to give them the real
lowdown
On life in engineering school.

He spoke of days at a drafting board,
Of nights spent on lab reports;
He told of Saturday classes,
But they made him cut it short.
"Stop; say no more, we beg of you;
Your life is the roughest of all."
So they set him up a quarter keg,
And they all sat down and bawled.

—THE KENTUCKY ENGINEER

JUST ONE MINUTE

(Continued from page 9)

the frequency of which has been multiplied until it is in the microwave region, and compares it to the atomic vibration frequency. This comparison is done electronically. Any difference in frequency between the multiplied oscillator frequency and the atomic frequency is utilized as an error signal that is fed back to alter the basic oscillator. The procedure resembles that of a servomechanism, and as a result, the system attempts to adjust itself so that there is no error signal. This means that in such a clock, in its perfected form, the crystal oscillator will function at a frequency that is nearly as accurate as the vibration of an atom. The crystal oscillator frequency may then be multiplied or divided to higher or lower frequencies. These frequencies split a given period of time into intervals that are equal in duration and of the specified amount of time.

The mechanics of such a time-measuring device are, of course, intricate and complex; but at least we can see that man's search for a precision standard of time is bringing him closer and closer to a realization of his ideals. Now he has a method of utilizing for his time stanard the constant vibrations from within the atom—the very foundation of all matter. Nature itself, it seems, is in this manner supplying her own answer to her own problems. With such instruments for the standardization of time measurement, man will ultimately be able to determine, with heretofore unheard of accuracy, the period of time that is exactly one day, or one hour,s or just one minute.

SCIENTIFIC NOTE

Recent tests conducted by the Physics Department prove that grasshoppers hear with their legs. In all cases the insetcs hopped when a tuning fork sounded nearby. There was no reaction to this stimulus, however, when the insects' legs were removed.

Superimposed over this man's head is the matrix (or heart) of RCA Electronic "Memory." See description below.

New RCA Magnetic "Memory" recalls thousands of facts in a fraction of a second

Each dot you see in the squares above is actually a magnetic "doughnut" so tiny that it barely slides over a needle point. Despite its size, however, each "doughnut" stores away one bit of information for future reference. And 10,000 of them fit on a framework smaller than the size of this page!

Here are the cells of the RCA magnetic "memory" that is the key element in virtually all high-speed electronic computers. The greatest significance of this "memory" is its ability to deliver, in a few millionths of a second, any information it holds.

Almost instantly, an insurance company can process a claim. Just as fast, a manufacturer with inventories spread around the country can determine what products are making money—and *where*.

With such "memories," electronic computers predict accurately the next day's weather for the nation, using data on atmospheric pressure, temperature, and wind velocity from every part of the United States.

The leadership in electronics that created this man-made RCA "memory" is responsible for one achievement after another in television, radio, radar and other RCA products.

WHERE TO, MR. ENGINEER?

RCA offers careers in research, development, design, and manufacturing for engineers with Bachelor or advanced degrees in E.E., M.E. or Physics. For full information, write to: Mr. Robert Haklisch, Manager, College Relations, Radio Corporation of America, Camden 2, N. J.

RADIO CORPORATION OF AMERICA

ELECTRONICS FOR LIVING

WERE YOU HERE?

The changing names on the MECHELECIV masthead for the years 1942 to 1944 give evidence of a staff romance in bloom. Mr. Fred Holcomb who was the first editor-in-chief, later associate editor, and then editor-in-chief for a second term apparently fully approved of one of the typists who was listed as Harmon Tyler until the November 1944 issue when she suddenly appeared as associate editor under the name of Harmon Holcomb.

The MECHELECIV at that time was said to have cost around $25.00 per issue to publish and the editor expressed concern from time to time as to where this money was to come from. Fortunately, the alumni seemed to find time to drop a spare dollar or two to the editor to be applied toward publication costs and the magazine managed to survive. This expense seems rather fantastic when viewed in retrospect by a member of the current staff who is aware of the fact that sometimes the cost of making an appropriate cut for the cover for one issue of the present magazine exceeds the cost of publishing the entire issue in those days.

Every so often a plaintive plea in the form of a request for assistance on the staff of the expanding MECHELECIV appeared in issues of that time. In that respect, the magazine has not changed. The present high-quality publication is being published by a staff smaller than the group that published the more informal and much smaller publication of that time.

In 1945 the MECHELECIV reflected the post-war return to normality with announcements of the return of some of the Professors from war leaves and at the same time forecast the abnormal crowding of the School of Engineering with returning veterans hungry for education and provided with the wherewithal by the first G. I. Bill. Dean Feiker's column of October 1945 consisted of a welcome home to the returning veterans and an explanation of how the school had functioned during the war under the capable temporary leadership of Professors Akers, Cruikshanks, and Walther as acting heads of the Electrical, Mechanical, and Civil Engineering Departments.

THE ENGINEER'S PSALM

Dean Mason is my instructor, I shall not pass.
He maketh me to exhibit mine ignorance before the whole class,
He telleth me more than I can write,
He lowereth my grade.
Yea, though I walk through the corridors of knowledge,
I do not learn.
He tries to teach me:
He writeth the equations before me in the hopes that I will understand them.
He bombardeth my head with integrations,
My sliderule freezeth up,
Surely enthalpies and entropies shall follow me all the days of my life,
And I shall dwell in the School of Engineering forever.

1922—Roll-out of a Boeing-built fighter

1954—Roll-out of America's first jet transport, the Boeing 707

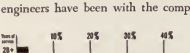
Progress is a Boeing-career hallmark

From the earliest days of aviation, Boeing engineers have produced an impressive number of trend-creating "firsts"—including the 707, America's first jet transport, shown above.

Boeing's 38-year history of Research, Design and Production progress has continuously opened up new career opportunities for engineers. Today Boeing employs more engineers than even at the peak of World War II.

At Boeing you'd work with engineers who developed: The world's first all-metal, 3-mile-a-minute commercial transport. The first pressurized airliner. The first effective four-engine bomber (the B-17). Today's fastest operational bomber (the six-jet B-47). The even more advanced B-52 eight-jet global bomber, and the 707, America's first jet transport. Boeing engineers continue to design "years ahead," doing research on nuclear-powered aircraft. They are also developing a new Air Force defense weapons system, based on the Boeing F-99 Bomarc pilotless interceptor. These long-range programs project Boeing progress far into the future.

One measure of the satisfaction of Boeing careers is given in the chart below. It shows that 46% of Boeing engineers have been with the company for five or more years; 25% for 10 or more years, and 6% for 15 or more years.



Here are other advantages: Boeing promotes from within and holds regular merit reviews to assure individual recognition. Engineers are encouraged to take graduate studies while working and are reimbursed for all tuition expense.

Of technical graduates at Boeing, 28% hold Mechanical Engineering degrees, 24% Electrical, 19% Aeronautical, and 9% Civil. The remainder is comprised of other engineering graduates, physicists and mathematicians.

For further Boeing career information consult your Placement Office, or write:

JOHN C. SANDERS, Staff Engineer—Personnel
Boeing Airplane Company, Seattle 14, Wash.

BOEING

SEATTLE, WASHINGTON WICHITA, KANSAS

WHAT ? **1955 ENGINEERS' BANQUET & BALL**

WHEN ? **SATURDAY, MAY 7, 1955**

WHERE ? **HOTEL 2400 2400 - 16TH ST., N.W.**

WHO ? **ALL ENGINEERING STUDENTS & ALUMNI**

Sponsored by

ENGINEERS' COUNCIL

OF

THE GEORGE WASHINGTON UNIVERSITY
SCHOOL OF ENGINEERING

MUSIC BY JOE MAGUIRE

DINNER - DANCE — 7 TO 12 P.M. —— $10.00 PER COUPLE
DANCE — 9 TO 12 P.M. —— $4.00 PER COUPLE
DINNER — 7 TO 9 P.M. —— $3.50 PER PLATE
DRESS OPTIONAL

Tickets may be purchased from
ALL ENGINEERING COUNCIL REPRESENTATIVES
THE UNIVERSITY BOOK STORE
THE DEAN'S OFFICE AND THE BOOTH IN THE STUDENT UNION

A. S. C. E.

A. S. M. E.

SIGMA TAU

THETA TAU

A I E E

I R E

ALUMVIEWS

YOUR VIEW AND OURS

MECHELECIV thanks its interested readers among the alumni who have clipped the alumview coupon and mailed it to us. Special thanks go to those who have written us one and two page letters. However, there is still a dearth of news from the alumni and it goes without saying that a page dedicated to news on alumni cannot exist without the help of the alumni themselves. Although we are indebted to the various alumni associations for their help in relaying news, we rely mainly on your responses via the coupon cut-out below for the contents of this page.

Alumviews will print anything that you, the alumni, wish—it is your page; about you, for you, and, we hope, by you.

The Sigma Tau alumni chapter of Washington, D. C., has a membership roll of 150. The current activities of the alumni association are being concentrated on planning for a manpower symposium. At the present time, the officers of the chapter are W. J. Mayo-Wells, President, Robert Neiderstrasser, Vice-President, and Herbert H. Rosen, Secretary-Treasurer.

TO: ALUMNI EDITOR
MECHELECIV MAGAZINE
Davis-Hodgkins' House
The George Washington University
Washington 6, D. C.

Here are a few comments for ALUMVIEW on where I'm working, what I'm doing and news of my family.

From: ---

Degree and date: ---
Check if member:

Theta Tau ____ **Sigma Tau** ____ **Other** ---

PRESIDENT'S MESSAGE

By Harry C. Connor
President, Engineers' Alumni Association

A big day for Engineer alumni of the University is coming up on Saturday, April 23rd when the Engineer Alumni Association holds its annual luncheon meeting at the Burlington Hotel in Washington.

At this affair, Engineer alumni from Washington and nearby points gather to renew acquaintances, hear plans for the future and enjoy an outstanding program. By the way, the luncheon will begin at 12:30 p.m.

We hope to have as our guest Mr. Charles H. Tompkins, donor of the new building for the School of Engineering. President Marvin and Dean Mason will be among our other distinguished guests. Awards will be presented by the Engineer Alumni Association to the outstanding seniors in the various fields of engineering.

This is the first function of its type the Association has held in over a year; therefore, it will take the added effort of all of us interested in the University and its School of Engineering to bring out our fellow alumni. Class tables will be set up for those who wish to join together with the men who were in school with them.

Let me urge each of you who can to make every effort to attend the annual luncheon meeting on Saturday, April 23rd.

FREDERICK M. HOLCOMB JR. (BEE '52) is now working as a research engineer for the Boeing Airplane Co. He was married May 9, 1953 and his first son was born Nov. 19, 1954 named William Morse Holcomb.

FRED L. MAYER (BME '50) has found the frigid winters in Milwaukee a bit cold for the last four years, two of which he has been designing heating ventilating and air conditioning equipment. Fred is married and has two children.

WILLIAM J. REED JR. (BEE '51) is now with the air force in Dayton as an engineer in the B-57 Bomber Weapons System Project Office.

HOWARD P. SUFFORD (EX. 17) has retired from the D. C. Public Schools and has been thoroughly enjoying living in Deland, Florida, since 1948.

HSIN PING WONG (BEE '54) is now studying towards a Master's Degree at the Brooklyn Polytechnic Insitute.

MELECIO G. ACANTILADO (B.S. Ch.E. '25) is the chief chemist-paper technologist for the Worldwide Paper Mill in the Philippines. He informs us that the GEORGE WASHINGTON UNIVERSITY ALUMNI ASSOCIATION OF THE PHILIPPINES gave a luncheon on February 22 at the Philippine Columbian, Manila. Alumviews extends its thanks to Mr. Acantilado for his interest in MECHELECIV.

Necklace of Linde Star Rubies and Diamonds worn at the Coronation of H. M. Queen Elizabeth II.

Man-made gems perfect as nature's finest—

created with the aid of photography's keen eye

Linde Air Products Company measures rare elements as close as 2 parts in a million with the spectrograph to produce star sapphires and star rubies more nearly perfect than natural gems.

Wartime instruments called for millions of synthetic jewel bearings. But supplies from Europe were shut off. So at Uncle Sam's request, Linde, a division of Union Carbide and Carbon Corporation, undertook to create sapphires and rubies—with photography filling a role in the intricate technology.

Postwar, Linde went even further. Using the spectrograph, a photographic instrument so sensitive it can measure the chemical content of celestial bodies, they found just the right trace of rare element to create a deep silky star within the stone and thus achieved the fabulous Linde "Stars"—man-made counterparts of one of nature's rarest gems.

This is the way photography is working in small companies and large, in laboratories, on production lines, in offices and drafting rooms. It is saving time, reducing error, cutting costs, improving production for all kinds of business and industry.

Graduates in the physical sciences and in engineering find photography an increasingly valuable tool in their new occupations. Its expanding use has created many challenging opportunities at Kodak, especially in the development of chemical processes and the design of precision mechanical-electronic equipment. If you are a recent graduate or a qualified returning serviceman, and are interested in these opportunities, write to Business & Technical Personnel Dept., Eastman Kodak Company, Rochester 4, N. Y.

Eastman Kodak Company, Rochester 4, N. Y.